



**H1. Project Sponsor: Nebraska Department of Natural Resources**

**H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology**

3. County(s) where project is located: Statewide with Early  
 Emphasis on Republican River Basin and Platte River Basin  
 Upstream of Kearney

4. Nearest town: NA

5. Total Amount Requested: \$423,960

6. Years of funding requested (select one): 1 2 **3**

**Contact Person:**

7. Name: Steve Gaul

8. Title: Supervisor, Planning and Assistance Division

9. Organization: Nebraska Department of Natural Resources

10. Address, City, State & Zip: PO Box 94676, Lincoln, NE 68509-4676

11. Daytime Phone: 402 471-3955

12. Alternate phone: 402-471-2081

13. Fax: 402 471-2900

14. E-mail: sgaul@dnr.ne.gov

15. Sponsor web page: http://dnr.ne.gov

16. Is this a continuation request for a project previously funded by the Trust: **NO**

Is this a resubmission of a project application previously not funded by the Trust: **NO**

17. Please indicate which category best describes the applicant:

Selections are: Individual City or County Natural Resources District Federal Agency Private for Profit  
 Private Nonprofit Consortium School, Irrigation, Power or Development District **State Agency** Other (specify):

18. Will this project receive federal funds or require a federal review or permit? **NO**

If yes, identify the agency(s) and its role:

19. Will this project receive other State of Nebraska funds or require a state review or permit? **YES**

If yes, identify the agency(s) and its role: Other anticipated funds over 3 year period include: Department of Natural Resources: \$10,000, UNL Project Contribution (In-kind) \$492,913. Future application may be made to the Noxious Weed and Invasive Plant Species Assistance Fund for any shortfall if less funding than hoped for is received from other sources.

20. In **300 words or less** provide an overview of the project for which you seek funding. If you are asking the Trust to fund only a portion of the project, indicate the components for which you seek funding.

**Project Overview**

This project's three year goal is to document and understand the complex behavior and response of river systems to riparian vegetation removal. It can help us to understand the effectiveness of various riparian vegetation management strategies in controlling consumptive water use in water short areas of the state, and especially in the Platte Basin above Columbus and the Republican Basin. This will help provide methods of improving ongoing efforts such as those funded through the Noxious Weed and Invasive Plant Species Assistance Fund and ultimately help us to better target efforts to provide maximum benefits in basins implementing limitations on water use.

Specific objectives include:



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- 1) Perform historical flood frequency analysis at select river basins to document changes in the disturbance regime.
- 2) Estimate maximum evapotranspiration (ET) in riparian areas across Nebraska's river networks.
- 3) Directly measure and quantify hydrologic fluxes and in-stream aquatic ecosystem health for two riparian-stream transects: (1) a control reach with invasive species, and (2) a reach with active invasive species removal.
- 4) Compare geomorphic controls on aquatic ecosystem health in control and treated stream reaches.
- 5) Adapt and implement a terrestrial ecosystem / land surface hydrology model across Nebraska's river basins to examine the regional water balance and potential impact of large-scale removal of riparian vegetation.
- 6) Compare and contrast historical river discharge with invasive species encroachment in order to estimate the in-stream flow regime required for maintaining a healthy riparian ecosystem.

Project outcomes are expected to include:

- 1) Model based estimation of impacts of vegetation removal within riparian zones.
- 2) Analysis of impacts of vegetation removal on water quality, geomorphology and hydrology.
- 3) Basin-wide understanding and prediction of hydrologic impacts of riparian invasive species removal throughout Nebraska.
- 4) Analysis of minimum hydrologic disturbance regime required for maintaining riparian function and minimizing invasive species infestation.
- 5) Provide tools to better manage riparian vegetation for economic, social and environmental needs.

An effort will be made to coordinate vegetation management efforts underway or about to begin for comparisons and transects. UNL personnel are partnering on this effort and will carry out the needed work with significant off budget work expected to occur prior to receipt of any trust funds.

|  |                                 |               |
|--|---------------------------------|---------------|
| 21. On behalf of the sponsor(s) named above, I hereby certify that the information contained in this application, including all attachments, is true, accurate and complete. |                                 |               |
| _____<br>Authorized Signature of Sponsor Organization  | _____<br>Title                  | _____<br>Date |
| _____<br>Typed or Printed Name of Authorized Signatory   | _____<br>Typed or Printed Title |               |



# NEBRASKA ENVIRONMENTAL TRUST FUND

## NARRATIVE SECTION

**H1. Project Sponsor: Nebraska Department of Natural Resources**

**H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology**

In five pages or less, provide a discussion of your project. Be sure to cover the points specified in the instructions.

### 1. Introduction

Riparian areas are critical zones on the landscape, representing the intersection between upland terrestrial systems and water bodies [NRC, 2002]. Active riparian areas within watersheds provide multiple ecological and human benefits, including controlling the stream temperature regime through stream shading, riparian buffer and nutrient retention from adjacent cropland, in-stream primary productivity, bank stability, channel patterns, wildlife habitat for hunting/fishing, and decreasing peak discharge within streams and rivers. Both water and energy cycles within riparian areas are governed by complex non-linear interactions, as changes in one may result in changes in all others, often degrading water quantity and quality, fish populations, public health, and recreation. Species diversity and other riparian ecosystem services are largely maintained on the landscape by disturbance events, including fires, floods, and grazing. However, fire suppression and flood control via dams has decreased natural disturbance regimes in riparian areas, resulting in the invasion of non-native vegetation across the western United States including Nebraska.

Non-native species within Nebraska 's riparian areas include Tamarisk (Salt Cedar), phragmites, and Russian olive. Across Nebraska, multiple agencies (e.g. FWS, NRD's) are involved in removing invasive species for 2 primary reasons: (1) provide habitat for wildlife (e.g. Central Platte River), and (2) reduce riparian water consumption. However, the overall water savings by invasive species removal and the impacts on aquatic ecosystems are largely uncertain. Some studies have suggested that transpiration in dense stands of Tamarisk exceed evaporation by 2-fold [e.g., Sala et al., 1996]. However, other studies measuring water savings after Tamarisk removal have not observed any benefits [Shafroth et al., 2005].

The current removal projects across the state provide an opportunity to assess both water savings and aquatic ecosystem impacts following invasive species removal. Our overall objective is to develop a quantitative understanding of the role of riparian vegetation dynamics, including the invasive species, on the complex interactions between hydrology, ecology, geomorphology, and chemistry of our streams both at local and regional-scales. To achieve this goal two major objectives of this proposal are: (1) to examine changes on water budgets and aquatic ecosystem health using a combination of targeted field-based measurements combined with larger, regional scale numerical modeling of the hydrological and ecological phenomena; and (2) analyze historical discharge records, document any changes in its frequency-magnitude behavior at different gages in relation to regional human impact, such as river regulation, and relate those to invasive species encroachment at select sites.

### 2. Objectives

Our goal is to document and understand the complex behavior and response of the river system to riparian vegetation removal. We would like to understand how the system, with its interrelated ecology, geomorphology, and hydrology components reacts to riparian vegetation removal, both at the reach scale and the entire basin scale. A necessary first step to this will be to examine changes in hydrologic disturbances (e.g. floods) from the early 1900's, in relation to climatic fluctuations and river regulations,



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that have contributed to invasive species encroachment within channels and riparian areas. Specific objectives are the following:

Perform historical flood frequency analysis at select river basins to document changes in the disturbance regime.

Estimate the maximum evapotranspiration (ET) in riparian areas across Nebraska's river networks.

Directly measure and quantify hydrologic fluxes and in-stream aquatic ecosystem health for two riparian-stream transects: 1) a control reach with invasive species, and 2) a reach with active invasive species removal.

Compare the geomorphic controls on aquatic ecosystem health in control and treated stream reaches.

Adapt and implement a terrestrial ecosystem / land surface hydrology model across Nebraska's river basins to examine the regional water balance and potential impact of large-scale removal of riparian vegetation.

Compare and contrast historical river discharge with invasive species encroachment in order to estimate the in-stream flow regime required for maintaining a healthy riparian ecosystem

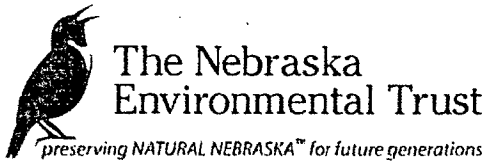
### **3. Project Design**

#### *3.1 A First-order estimate of riparian ET*

We will develop a simple GIS-based model to estimate regional riparian ET and investigate the influence of riparian vegetation cover on the water balance. Such a tool will provide "what if" scenarios for watershed management, help to assess economic impacts of vegetation removal, and identify experimental and modeling research directions. The model will be based on existing theory in evapotranspiration, and will include two simulation options: (1) estimation of the evapotranspiration rate of the existing vegetation cover, using LANDSAT data for relevant vegetation properties such as the leaf area index (LAI), as well weather data to force ET models; and (2) employ a simple riparian vegetation growth model to simulate ecological recovery and potential changes in ET rates. The latter component will be accompanied by a weather generator for simulating changes into the future. Estimated daily rates of evapotranspiration will be tested against field-measured values (described later).

#### *3.2 In-situ hydrologic & hydrochemistry budgets along stream-riparian transects*

In-situ monitoring sites are currently being identified from several options within the Republican Basin and Platte River Basin above Columbus to quantify and compare the dominant hydrologic processes in conjunction with in-stream aquatic ecosystem health between a control and treated river reach. The riparian vegetation in both of these sites has been highly altered over the last 100 years due to decreased fire frequency (historical fire frequency 1 – 6 years), lack of bison grazing, and decreases in both streamflow and sediment discharge. After invasive species treatment, the riparian zone will, for a period of time, exhibit decreased ET until it is replaced by new vegetation, and the resulting net change in ET will be dependent on the net change in LAI and other hydrologic factors. Furthermore, we expect that



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removal in the riparian vegetation and resulting changes in hydrologic processes will impart a signal on in-stream ecosystem health and biogeochemical fluxes.

We will be measuring daily water fluxes of ET, precipitation (P), infiltration (I), and streamflow (Q) at both of these sites for a period of 3 years to quantify changes in the land surface hydrology.

Secondly, in-stream hydrochemical fluxes and net aquatic ecosystem metabolism will be measured across the annual hydrograph at the two sites. We have in-situ sensors to measure turbidity, O<sub>2</sub>, pH, temperature, conductivity, photosynthetically active radiation, dissolved organic matter, and stage. Additionally, each station has an automatic water sampler for capturing storm events across the hydrograph, and can be triggered remotely. Data from these sensors will be uploaded via cellular modem for data analysis and or viewing on a public website.

### *3.3 Geomorphic & Biogeochemical interactions*

Large-scale removal of invasive species within the riparian zone may also alter the geomorphology of the stream system by altering bank stability, sediment transport, and bar infiltration. Such changes may have important implications on channel morphology and the large-scale geomorphic response of the system, as a channel network is an inter-connected structure (Istanbulluoglu et al., 2005a, 2005b). In the vegetation removal sites we will periodically measure root tensile strength, soil moisture at transects in both river banks and flood plain, and evapotranspiration. We expect to see changes in channel form as a result of bank erosion and destabilization, which will be periodically documented. These observations will be related to water quality experiments described below.

Active bars within channels are not only important for shallow water habitat, but also for filtering and removing excess nutrients from the aquatic ecosystem. Using an introduced hydrologic tracer, we will measure nitrogen removal within each of the experimental reaches in year 2 of the study. In addition to this experiment, we will measure denitrification within multiple channels across the state in both control and restored stream reaches using push-pull techniques (with a hydrologic and nitrate tracer). This comparison combined with point scale denitrification measurements from other control and treated (restored) stream reaches across the state will allow us to quantify this transformation process that results in decreased downstream N-loads.

### *3.4 Regional hydrologic & hydrochemical modeling: IBIS*

A regional hydrologic modeling system will be used to complement and expand upon the results of the field measurements. This will be done both to provide a mechanistic understanding and verification of the field observations as well as a means to scale the results up from the local to regional scale (i.e., statewide). The model we will be using for this purpose is the Integrated Biosphere Simulator (IBIS), a dynamic global vegetation model that has been used in numerous studies of land surface hydrology and vegetation-atmosphere interaction (Kucharik et al., 2000, Lenters et al., 2000, Donner et al., 2002, Twine et al., 2004). IBIS has been extensively validated against observational datasets at local, regional, and global scales and has been updated to include managed, agricultural ecosystems as one of the model's land cover types. Agro-IBIS, as it is referred to, has been evaluated across the U.S. (Kucharik 2003) and was recently used to study trends in corn planting dates (Kucharik 2006).



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The IBIS model simulates a complete hierarchy of ecosystem phenomena, including: (a) *land surface physics* (energy, water, and momentum exchange within the soil-vegetation-atmosphere system), (b) *canopy gas exchange* (photosynthesis, respiration, and stomatal behavior), (c) *plant phenology* (seasonal cycles of leaf development, leaf senescence, and plant activity), (d) *whole-plant physiology* (allocation of carbon and nitrogen, plant growth, tissue turnover, and age-dependent changes), (e) *vegetation dynamics* (competition for resources, mortality, disturbances), and (f) *carbon and nitrogen cycling* (flow of carbon and nitrogen between the atmosphere, vegetation, litter, and soils).

One of the investigators on this project (J. Lenters) has prior experience with the IBIS model, and we will be collaborating with the lead developer of Agro-IBIS (C. Kucharik) at the University of Wisconsin-Madison to adapt Agro-IBIS for the current riparian vegetation study. This will entail incorporation of species-level vegetation characteristics into IBIS for phragmites, tamarisk, and Russian olive, as well as generating input datasets of climate and land cover at an appropriate resolution to run the model at local to regional scales (e.g., 30-m for local scales, 1-km for statewide scales). IBIS will initially be used to simulate the water balance (ET, soil moisture, runoff, etc.) at the site level for comparison with results from our field measurements. The model will then be adjusted, as necessary, and scaled-up to the regional level to generate water balance simulations for the entire state of Nebraska. Simulations will be run with and without riparian vegetation to assess the impacts of vegetation removal on the regional water balance.

#### 4. Benefits & Outcomes

##### *Benefits to Water Management*

This project can help us to understand the effectiveness of various riparian vegetation management strategies in controlling consumptive water use in water short areas of the state, and especially in the Platte Basin above Columbus and the Republican Basin. This will help provide methods of improving ongoing efforts such as those funded through the Noxious Weed and Invasive Plant Species Assistance Fund and ultimately help us to better target efforts to provide maximum benefits in basins implementing limitations on water use.

##### *Environmental benefits & outcomes*

This project also will have 5 primary outcomes listed below:

*A first-order, model-based estimation of impacts of vegetation removal (e.g. salt cedar, Russian olive, phragmites) within riparian zones (using simplified spatial analysis):* This analysis will provide an estimate of the amount of water saved relative to the mean annual stream discharge, and may be used in future water saving and economic analyses. The benefit of this tool will twofold, first it will be straightforward to use for water resources engineers, and second it will have the potential for modifications to use for crop ET calculations for the entire state.

*Analysis of the impacts (both positive and negative) of vegetation removal on water quality, geomorphologic, and hydrologic parameters:* These direct measurements will incorporate the

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environmental impacts to invasive species removal, providing information to manage these systems. When linked with the modeling approach, regional implications of these local impacts will be estimated.

*Basin-wide understanding and prediction of hydrologic impacts of riparian invasive species removal throughout the state of Nebraska:* The IBIS modeling system will provide a tool to address water and environmental questions across Nebraska's watersheds. In addition to informing us on riparian areas, development of this model will also be beneficial for future problems.

*Minimum hydrologic disturbance regime required for maintaining riparian functioning, minimizing invasive species infestation:* This analysis will provide us with the ability to determine what types of flows are required to maintain a health riparian function, which can then be compared to the economic costs of other management options.

### *5.2 Economic & social impacts*

This project will benefit the citizens of Nebraska including farmers, landowners, tourists, and citizens involved in outdoor recreation in many different ways. First of all the models that will be developed and adopted for the region will be available for use not only for studying the influence of riparian vegetation, but also for crop and irrigation management, and water allocation issues within the state, as well as to address interstate water rights. The knowledge gained through field studies will be beneficial for managing water quality, and aquatic ecosystem health across the state. Maintenance of our riparian – stream networks across Nebraska provides Nebraskans with an opportunity for fishing/hunting, canoeing, birding, and other outdoor activities. Businesses also value the impact of tourists on visiting the state during the bird migration periods, which are dependent on functioning stream ecosystems. Maintaining in-stream flow for ecological/legal obligations is largely driving the interest in invasive species within riparian areas. Our study will provide the tools and analysis necessary to quantify hydrologic and aquatic ecosystem impacts, and prevent the degradation of Nebraska's waterways.

## **5. Project Report**

In addition to the data noted above all findings will be summarized in a final project report that provides both detailed information and notes how project data can be accessed.

## **6. Project Evaluation**

The project activities will follow the timeline given below. We will evaluate the scientific goals and outcomes as well as their contribution to our understanding and protection of the ecological and water resources of Nebraska. This will be achieved by scheduling biannual meetings with the Department of Natural Resources and Nebraska Game and Parks Commission and, in consultation with such agencies, engaging outside stakeholders in the evaluation of the project outcomes and their implementation in land and water management practices. We will develop annual reports to the Trust that will summarize the progress achieved regarding the science, papers published, and discussions and feedback from Nebraska State agencies.

Further project evaluation will occur through peer-review of scientific papers in professional journals, as well as presentations at conferences, workshops, and colloquia. This project will be conducted in close



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collaboration with other research groups at the University that are studying the impact of riparian vegetation. We will hold meetings with those groups and report our collaborative products to the Trust.





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NEBRASKA ENVIRONMENTAL TRUST FUND

APPLICATION BUDGET SUMMARY

H1. Project Sponsor: Nebraska Department of Natural Resources

H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology

\* \$242,000 on Equipment was spent before initiation of the grant and is not included in totals but is noted in parentheses

BUDGET YEAR: SUMMARY

| Column A                            | Column B                     | Column C                       | Column D                        | Column E | Column F                               |
|-------------------------------------|------------------------------|--------------------------------|---------------------------------|----------|--|
| 1. Source of Funds ►                | Nebraska Environmental Trust | University of Nebraska In-Kind | Department of Natural Resources |          | <b>TOTALS ▼</b>                        |
| 2. Budget Category ▼                |                              |                                |                                 |          | 329832                                 |
| 3. Personnel and Fringe Benefits    | 291,660                      | <del>36,172</del><br>28,172    | 10,000                          |          | \$337,832<br><del>\$315,160</del>      |
| 4. Equipment                        | 28,000                       | (242,000)*                     |                                 |          | \$28,000<br>(\$242,000)                |
| 5. Travel                           | 19,000                       |                                |                                 |          | \$19,000                               |
| 6. Other Direct Costs               | 85,300                       |                                |                                 |          | \$85,300                               |
| 7. Finance / Admin Overhead @ 44.9% |                              | 214,041                        |                                 |          | \$214,041                              |
| 8.                                  |                              |                                |                                 |          |  |
| 9.                                  |                              |                                |                                 |          |  |
| 10.                                 |                              |                                |                                 |          |  |
| 11.                                 |                              |                                |                                 |          |  |
| 12.                                 |                              |                                |                                 |          |  |
| 13.                                 |                              |                                |                                 |          |  |
| 14.                                 |                              |                                |                                 |          |  |
| 15.                                 |                              |                                |                                 |          |  |
| 16.                                 |                              |                                |                                 |          |  |
| 17.                                 |                              | 242213                         |                                 |          | 676173                                 |
| 18. TOTALS ►                        | \$4233,960                   | \$250,213<br>*(\$242,000)      | \$10,000                        |          | <del>\$68476,173</del><br>*(\$242,000) |



# NEBRASKA ENVIRONMENTAL TRUST FUND

## APPLICATION BUDGET YEAR ONE

H1. Project Sponsor: Nebraska Department of Natural Resources

H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology

BUDGET YEAR: ONE

(This page is used by multi-year grants only. If your project is not a multi-year grant, then ignore or delete this page.)

\* \$242,000 on Equipment was spent before initiation of the grant and is not included in totals but is noted in parentheses

| Column A                            | Column B                     | Column C                         | Column D                        | Column E | Column F                      |
|-------------------------------------|------------------------------|----------------------------------|---------------------------------|----------|-------------------------------|
| 1. Source of Funds ►                | Nebraska Environmental Trust | University of Nebraska In-Kind   | Department of Natural Resources |          | TOTALS ▼                      |
| 2. Budget Category ▼                |                              |                                  |                                 |          |                               |
| 3. Personnel and Fringe Benefits    | 144,340                      | 14,672                           | 5,000                           |          | 149,340<br>\$164,012          |
| 4. Equipment                        | 28,000                       | *( <u>\$242,000</u> )            |                                 |          | 28,000<br>*( <u>242,000</u> ) |
| 5. Travel                           | 9,500                        |                                  |                                 |          | 9,500                         |
| 6. Other Direct Costs               | 42,650                       |                                  |                                 |          | 42,650                        |
| 7. Finance / Admin Overhead @ 44.9% |                              | 113,241                          |                                 |          | 113,241                       |
| 8.                                  |                              |                                  |                                 |          |                               |
| 9.                                  |                              |                                  |                                 |          |                               |
| 10.                                 |                              |                                  |                                 |          |                               |
| 11.                                 |                              |                                  |                                 |          |                               |
| 12.                                 |                              |                                  |                                 |          |                               |
| 18. TOTALS ►                        | 224,490                      | 127,913<br>*( <u>\$242,000</u> ) | 5,000                           |          | 357,213 <u>403</u>            |



**NEBRASKA ENVIRONMENTAL TRUST FUND  
APPLICATION BUDGET YEAR TWO**

**H1. Project Sponsor: Nebraska Department of Natural Resources**

**H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology**

**BUDGET YEAR: TWO**

(This page is used by multi-year grants only. If your project is not a multi-year grant, then ignore or delete this page.)

| Column A                                   | Column B                            | Column C                       | Column D                        | Column E | Column F        |
|--|-------------------------------------|--------------------------------|---------------------------------|----------|-----------------|
| <b>1. Source of Funds ►</b>                | <b>Nebraska Environmental Trust</b> | University of Nebraska In-Kind | Department of Natural Resources |          | <b>TOTALS ▼</b> |
| <b>2. Budget Category ▼</b>                |                                     |                                |                                 |          |                 |
| <b>3. Personnel and Fringe Benefits</b>    | 147,320                             | 13,500                         | 5,000                           |          | 165,820         |
| <b>4. Equipment</b>                        |                                     |                                |                                 |          |                 |
| <b>5. Travel</b>                           | 9,500                               |                                |                                 |          | 9,500           |
| <b>6. Other Direct Costs</b>               | 42,650                              |                                |                                 |          | 42,650          |
| <b>7. Finance / Admin Overhead @ 44.9%</b> |                                     | 100,800                        |                                 |          | 100,800         |
| <b>8.</b>                                  |                                     |                                |                                 |          |                 |
| <b>9.</b>                                  |                                     |                                |                                 |          |                 |
| <b>10.</b>                                 |                                     |                                |                                 |          |                 |
| <b>18. TOTALS ►</b>                        | 199,470                             | 114,300                        | 5,000                           |          | 318,770         |



# NEBRASKA ENVIRONMENTAL TRUST FUND

## APPLICATION BUDGET JUSTIFICATION

**H1. Project Sponsor: Nebraska Department of Natural Resources**

**H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology**

1. Have other sources of funding not listed in the Budget Worksheet been approached for project support? If yes, name them and explain the outcome of your request.

No

2. Are all of the matching funds in the Budget Worksheet confirmed? If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources do not confirm participation.

Yes

3. If any of the project costs identified in Column B of the Budget Worksheet have been expended or if debt has been incurred for these costs or a sponsor or partner is obligated for these costs in any other way: List these costs here. Explain clearly why Trust grant funds are requested for these costs.

Work on this project is set to begin in October 2007, well ahead of receipt of any Trust funds. However, Trust funds would only be used for work occurring after the date of receipt of the Trust grant.

4. For each line item in column A of the Budget Worksheet, justify the basis for the dollar amount indicated for that item.

| CATEGORY/COMPONENT<br>(from Column A of the<br>Budget Worksheet) | BASIS USED TO<br>DETERMINE COST  | Attachment?<br>Y or N | ATTACHMENT<br>LABEL |
|--|--|-----------------------|---------------------|
| 3. Personnel and Fringe Benefits                                 | Actual Salaries of some Personnel and amount of time each is to spend on project – Described in Attachment | Y                     | Attachment A        |
| 4. Equipment   | Estimated cost of equipment as described in attachment   | Y                     | Attachment A        |
| 5. Travel  | Estimated Cost described in attachment   | Y                     | Attachment A        |
| 6. Other Direct Costs  | Estimated Cost Described in Attachment   | Y                     | Attachment A        |
| 7. Finance/Admin Overhead @ 44.9%                                | Not Charged to Trust – In kind only at 44.9% on University costs   | N                     |                     |
| 8.   |  |                       |                     |
| 9.   |  |                       |                     |
| 10.  |  |                       |                     |
| 11.  |  |                       |                     |
| 12.  |  |                       |                     |
| 13.  |  |                       |                     |



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## NEBRASKA ENVIRONMENTAL TRUST FUND PROJECT SPONSOR FINANCIAL INFORMATION

**H1. Project Sponsor: Nebraska Department of Natural Resources**

**H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology**

Please see the instructions for section C-3. Attachments to this document may be necessary to complete this section. Include these attachments with your hard copy submission.

The Nebraska Department of Natural Resources has a FY 2008 appropriation of about \$21 million. Of the appropriated amount about \$11.1 million is for pass through funds and about \$9.9 million is for contracts and agency expense.



# NEBRASKA ENVIRONMENTAL TRUST FUND

## TIMELINE

**H1. Project Sponsor:** Nebraska Department of Natural Resources

**H2. Project Name:** Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology

See instructions for section D.

| Month/Year   | Task Description:                          |
|--------------|--|
| October 2007 | Site Setup Begins                          |
| October 2007 | Work on Objective 4 Begins                 |
| Dec. 2007    | Site Setup Complete                        |
| January 2008 | Work on Objective 2 Begins                 |
| March 2008   | Work on Objective 1 Begins                 |
| June 2008    | Work on Objective 3 Begins                 |
| July 2008    | Environmental Trust Grant Begins           |
| June 2009    | Work on Objective 1 Completed              |
| Sept. 2009   | Work on Objective 3 Completed              |
| Sept 2005    | Work on Objective 5 Begins                 |
| Jan. 2010    | Work on Synthesis Begins                   |
| March 2010   | Work on Objective 5 Completed              |
| July 1 2010  | Work on Objective 2 Completed              |
| July 1 2010  | Work on Objective 4 Completed              |
| July 1 2010  | Work on Synthesis / Final Report Completed |
| July 1 2010  |  |

### 7. Project Timeline

| TIME LINE  | Site setup | NE Trust start | Obj. 1    | Obj. 2 | Obj. 3 | Obj. 4 | Obj. 5 | Synthesis | NE Trust end |
|--|------------|----------------|-----------|--------|--------|--------|--------|-----------|--------------|
| <b>2007</b>  | F          |                |           |        |        | F      |        |           |              |
| <b>2008</b>  |            | Su             | Sp, Su, F | AY     | Su     | Su, F  |        |           |              |
| <b>2009</b>  |            |                | Sp        | AY     | Su     | AY     | F      |           |              |
| <b>2010</b>  |            |                |           | AY     |        | AY     | W, Sp  | W, Sp, Su | Su           |
| <b>Sp = spring, Su = summer, F = fall, W = winter, AY = all year</b> |            |                |           |        |        |        |        |           |              |



## NEBRASKA ENVIRONMENTAL TRUST FUND PARTNERS

**H1. Project Sponsor: Nebraska Department of Natural Resources**

**H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology**

Please see the instructions for filling out section E. Letters of confirmation should be included with your hard copy submission.

| <b>Partner</b>                            | <b>Contribution</b>  |
|---|--|
| University of Nebraska                    | \$250,213 to \$492,213 746,216 in in-kind services – conducts the major work for the project |
| Department of Natural Resources (Sponsor) | \$10,000 Cash plus grant administration  |
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**NEBRASKA ENVIRONMENTAL TRUST FUND**  
**REAL ESTATE / SITE PLAN**

**H1. Project Sponsor: Nebraska Department of Natural Resources**

**H2. Project Name: Riparian Vegetation Impacts on Water Quantity, Quality, and Stream Ecology**

This section will not apply to every project. Please see instructions for section F. Attachments should be sent with the hardcopy submission.

| <b>Legal Description</b> | <b>County</b> | <b>#Acres</b> |
|--------------------------|---------------|---------------|
| NA                       |               |               |
|                          |               |               |
|                          |               |               |
|                          |               |               |